REMARKS

This is a supplemental amendment filed in response to the personal interview with the Examiners at the U.S. Patent Office held on September 23, 2003. Various questions raised by the Examiners are answered in these REMARKS and claim changes designed to reach agreement regarding allowance subject matter have been made in the above claims.

I. The Claim Changes and the Essential Features of the Invention

During the interview the necessity of separate sets of claims for the measuring probe for use in a gaseous medium and liquid medium respectively was questioned. Applicants agree that two sets of claims are not necessary because the measuring probe, as claimed in claim 9, is usable in various liquid and gaseous media. One of the main advantages of their claimed measuring probe is universality or at least wide applicability: it can be used from many different chemical agents in various gaseous and liquid media.

One reason for the wide applicability of the applicants' claimed measuring probe is because the changes in electrical properties occur due to adsorption of agent molecules on the surface of the measuring probe to form an active surface which changes the measured electrical properties of the measuring probe, preferably the conductance. Adsorption is a well-known phenomenon in which

molecular species are bound to a surface, by physical or chemical forces. Since the physical forces are comparatively non-selective, some adsorption occurs for all chemical species.

The adsorption phenomenon is to be distinguished from absorption, in which molecular species are taken into the interior of the absorbing media. Adsorption is entirely a surface phenomenon in which the adsorbed species is bound to a surface.

The inventive probes and procedures of the applicants are distinguished by the fact that the sensor-active solid layer (4) operates by adsorption of the agent molecules and changes its electrical properties because of the adsorption of the agent molecules. The measured change in the electrical properties, preferably conductance, is characteristic of both the nature of the agent molecules and the number of agent molecules in the gas or liquid above the active surface of the measuring probe.

Also the liquid covering film 7 is characterized as being formed from the gas or liquid in which the measuring probe is used. The same location in the specification, pages 7 to 8, explains that in humid air the liquid covering film forms because of the finite humidity of the air, i.e. water is adsorbed on the surface of the measuring probe from the air above it to form a covering film of water. In the case of a liquid medium the probe operates under saturation conditions with respect to adsorption of the liquid (page 5, line 19 and following of the English translation of the specification). That means that the liquid covering film comprises liquid molecules adsorbed from the liquid medium.

Independent claim 9 for the measuring probe has been amended to reflect the above understanding. First, the claimed measuring probe is equally useful in gas or liquid so that claim 9 has been amended to include the subject matter of canceled claim 13 so that it covers the probe for gaseous and/or liquid media. Also claim 9 has been amended to state that the agent molecules can be in a liquid or the gas.

In addition the sensor-active solid layer 4 has been limited to a solid layer, which reacts to adsorption of the agent by changing electrical properties thereof. Basis for this change appears on page 7, line 25 to page 8,line 14, of the English translation of the specification. At that point in the specification the term "agent molecules" is used and on page 7, line 26 to 29, the term "adsorption" is used in connection with the mechanism of operation of the sensor-active solid layer 4.

Finally, the liquid covering layer 7 is formed by adsorption of the liquid molecules from the liquid medium or by adsorption from the gas. Of course in the case of adsorption of agents from the gas, there must also be a species, such as water vapor, in the gas that is adsorbed to form the liquid covering film 7.

Other wording in claim 9 was changed to provide consistent claim wording.

Similarly the method claims 18 and 19 have been amended in a manner similar to the measuring probe claims. In addition in method claim 18 the phrase "by adsorption" has been added in step b) to characterize the doping of the surface with agent molecules.

II. Rejections based on Choulga, et al, U.S. Patent 6,004,442

Claims 1 to 7 were rejected as anticipated under 35 U.S.C. 102 (b) by Choulga, et al, WO 96/12176, evidenced by U.S. Patent 6,004,442.

Claim 8 was rejected as obvious under 35 U.S.C. 103 (a) over Choulga, et al, and Tawil, et al.

Claims 13 to 15 have now been canceled.

Claims 9 to 12 and 16 to 18 contain subject matter from canceled claims 1 to 7. Additional distinguishing features and limitations have been added to these claims by the above changes to further distinguish them patentably from the cited prior art, Choulga, et al (as evidenced by U.S. Patent 6,004,442 A). The features of canceled claim 8 are now in claim 19. They are considered features of a preferred embodiment, which are not now used to distinguish the claimed invention from the prior art.

1. Anticipation

The amended measuring probe claims 9 to 12 and 16 and 17 are clearly not anticipated by Choulga, et al.

First, the sensor-active solid layer of the present claims 9 to 19 is fundamentally different from the analyte-specific layer of Choulga, et al. The measuring probe of the applicants, as claimed in claims 9 and 16, operates by a fundamentally different mechanism from the probes of Choulga, et al.

Choulga, et al, discloses an analyte-specific layer designed to absorb or extract a specific agent from a liquid in which the probe of Choulga, et al, is inserted (claim 1). The analyte-specific layer must be ionically conductive (claim

1, lines 6 to 7. According to column 4, lines 30 to 40, the fundamental reason that the conductivity properties change is due to changes in the distribution of ions or material to be detected between the analyte-specific layer and the solution above it (which contains ions in the case of preferred embodiments of Choulga, et al). Also according to claim 1, line 8 and following, the analyte-specific layer is provided with coupling members, which selectively remove the analyte (agent) from the solution (liquid medium).

Thus the operative mechanism in Choulga, et al, for measuring change in electrical properties is absorption or desorption from the analyte-specific layer, which is fundamentally different from the adsorption mechanism in the case of the claimed measuring probes of claims 9 and 16.

The analyte-specific layer of Choulga, et al, must be designed for a specific agent during manufacture with particular coupling elements. Because it is analyte-specific it has a comparatively high degree of sensitivity for the particular agent for which it is designed but it cannot be used to measure the concentration of other agents. In contrast, the adsorption mechanism used by applicants in their measuring probes permits a wide range of different agents to be measured and characterized but would have comparatively low sensitivity. However the liquid covering layer allows several orders of magnitude improvement in the sensitivity of this latter type of probe based on adsorption according to the invention. See, for example, page 6, line 14 to 26.

For example, this type of probe can be used to detect several molecules in

human breath, for example traces of drugs, alcohol or disease molecules. In this type of probe the concentration of these species in the range of ppt (parts per trillion) have been detected (see again page 6, line 14 and following).

The sensor-active solid layer can be made from all types of organic polymer and organic semiconductor polymer. One example that has been provided by the applicants is "poly(2,5-furylen)-vinylene". It would be possible also to use epoxide resin as the sensor-active solid layer. Also doped silicon can be used as the sensor-active solid layer. These exemplary materials clearly would not conduct ions, as required by claim 1 of Choulga, et al.

In order for a prior art reference to anticipate a claimed invention each and every element must appear in that prior art reference, either expressly or inherently. However the following elements in amended claims 9, 16 and 18 do not appear in the disclosure or claims of Choulga, et al:

(1) a sensor-active solid layer that reacts to adsorption of agent molecules from a gas or liquid to change its electrical properties; and

(2) a liquid covering film arranged between the gas or liquid and the sensor-active solid layer.

Even in the case of a liquid layer of liquid molecules absorbed from a liquid, such as water molecules adsorbed from a large body of water (lake), the covering layer has different properties from the bulk water, because it is an adsorbed layer on the surface. This surface adsorbed layer interacts with and exchanges molecules with the adsorbed agent to produce complex effects on the electrical conductance.

2. Obviousness

Applicants' amended measuring probe claim 9 claims a measuring probe operating on a different principle, as explained above. The agent molecules are adsorbed on the solid layer 4 and replace part of the liquid covering film, thus changing the electrical, specifically the conductance, properties of the probe. This is explained in more detail above in connection with the anticipation rejection.

It is well established by many U. S. Court decisions that to reject a claimed invention under 35 U.S.C. 103 there must be some hint or suggestion in the prior art of the modifications of the disclosure in a prior art reference or references used to reject the claimed invention, which are necessary to arrive at the claimed invention. For example, the Court of Appeals for the Federal Circuit has said:

> "Rather, to establish obviousness based on a combination of elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant...Even when obviousness is based on as single reference there must be a showing of a suggestion of motivation to modify the teachings of that reference.." ***In re Kotzab***, 55 U.S.P.Q. 2nd 1313 (Fed. Cir. 2000). See also M.P.E.P. 2141

Thus to modify the disclosure of Choulga, et al, to obtain the applicants' invention as claimed in amended claim 9, it would be necessary to replace the analyte-specific layer with the sensor-active solid layer that operates by adsorption, instead of absorption. However this modification would change the

material properties of the measuring probe as well as the benefits and advantages of the invention of Choulga, et al.

Thus to obtain the subject matter of amended claim 9 it would be necessary to change the basic principle of operation of the measuring probe of Choulga, et al. However it is an established legal principle (based on case law) that, if it is necessary to modify or change the basic principle of operation of an apparatus or device disclosed in a prior art reference used to reject a claimed invention in order to arrive at the claimed invention, the prior art reference is insufficient to provide a basis for rejection of the claimed invention under 35 U.S.C. 103 (a). See, for example, M.P.E.P. 2143.01 and *In re Ratti*, 123 USPQ 349 (CCPA 1959).

The same is true of the subject matter of method claim 18.

For the foregoing reasons and because of the changes in the claims, it is respectfully submitted that amended claims 9 to 12 and 16 to 19 should not be rejected under 35 U.S.C. 102 (b) as anticipated by Choulga, et al, or under 35 U.S.C. 103 (a) as obvious from Choulga, et al.

III. Changes in the Abstract

The abstract filed in the previous amendment was amended to provide similar changes as in the independent measuring probe and method claims.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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